MYCOFLORA ON OLDENLANDIA CORYMBOSA

M. Dorcas. I. Sobha Rani and Mary Esther Cynthia

[1,2] *Department of Botany, O.U.C.W., Koti, Hyderabad (India)*

ABSTRACT

Mycoflora on the plant Oldenlandia corymbosa was isolated from Non-rhizosphere ,Rhizosphere, Rhizoplane and Phylloplane. About 55 fungal species belonging to different genera are isolated from different niches. The fungal species were isolated using PSA medium they were later related with the physical and edaphic factors.

Keywords: Nonrhizosphere, Rhizosphere, Rhizoplane Phylloplane, Physical Factors, Chemical Factors and Mycoflora.

I INTRODUCTION

oldenlandia corymbosa belongs to family Rubiaceae. It is a small herb with weak, angular, branched prostrate stem with simple, lanceolate, opposite decussate leaves and inflorescence is dichasial cyme. It is a common weed found throughout the year but abundant during rainy and winter seasons. The plants were collected from various places of Hyderabad to assess the mycoflora present in non-rhizosphere, rhizosphere, rhizoplane and phylloplane.

II MATERIAL AND METHODS

Sampling was regularly done for every 20 days. Soil samples were collected with travel which was sterilized with 70%alcohol from top 5-6" after scraping away an inch of surface soil and immediately transferred into sterilized polythene covers. Rhizosphere soil samples were taken from root zone of the plant after uprooting them from the soil and collected them in polythene covers. Soil pH and moisture were recorded immediately and one gram of soil sample was mixed with 10ml of sterilized water for serial dilution. Rhizosphere and non –rhizosphere soils were analyzed for available Phosphorus, Potassium, Organic carbon and Nitrogen, simultaneously rhizoplane and phylloplane were also collected and subjected to serial dilution. Mycoflora were estimated using Potato sucrose medium.

III RESULTS AND DISCUSSION

A total of 55 fungal species were isolated from non-rhizosphere, rhizosphere and phylloplane(Table-I).Nonrhizosphere harbored 31 fungal species.Fungal species *Absidia glaucus*,*Aspergillus funiclosus, Aspergillus fumigatus*,*Aspergillus sydowi*,*Cunninghamella echinulata, Gliocladium sp, Humicola sp* and *Myrothecium gramineum* are confined to nonrhizosphere soils. A total of 33 fungal species were isolated from rhizosphere soils some of the fungal species were *Aspergillus nidulans*,*Aspergillus ustus, Aspergillus varicolor*,*Chaetomium aureum, Drachslera hawaiiensis, Drachslera rostata, Sphaeronema sp, Sclerotuim sp, Spicaria fusispora, Neocosmospora sp, Memnoniella echinata* and *Torula herbarum.* Soil is very rich in microorganisms ranging from few lakhs to several millions per gram Waksman (1944). Several other workers Sharada (1998), Mukerjee saha and Chakravarthy(1999) reported abundance of fungi in rhizosphere soils than non rhizosphere soils. Most of the fungal species isolated were saprophytic some were parasitic others were antagonistic. Rhizoplane mycoflora are estimated by grinding 1gm of root material along with adhering soil particles following technique suggested by Stover and Waite(1954).Rhizoplane supported a sum of 18 fungal species in general rhizosphere mycoorganisms were higher than rhizoplane. The chemical and physical nature of the soil around the root zone is different soil away from root zone. Some of rhizoplane species are *Chaetomium bostrychodes, Fusarium bostrychodes.*

Table -1 shows percentage frequency of fungal species isolated from weed oldenlandia coryombosa.

S.no	NAME OF THE FUNGAL SPECIES	NRS	RS	RH	PP
1	*Absidia glauca*	2.20	0.00	0.00	0.00
2	*Alteranria alteranta*	0.00	3.21	2.22	0.00
3	*Aspergillus clavatus*	0.00	2.22	0.00	1.10
4	*Aspergillus flavus*	3.21	2.22	0.00	0.00
5	*Aspergillus fumigatus*	2.22	0.00	0.00	0.00
6	*Aspergillus funiclosus*	1.18	0.00	0.00	0.00
7	*Aspergillus nidulans*	0.00	6.84	0.00	0.00
8	*Aspergillus niger*	12.48	9.46	6.84	9.46
9	*Aspergillus sydowi*	1.82	0.00	0.00	0.00
10	*Aspergillus terreus*	9.46	1.10	6.84	1.1
11	*Aspergillus ustus*	0.00	1.10	0.00	0.00
12	*Aspergillus varicolor*	0.00	0.56	0.00	0.00
13	*Aureobasidium pullulans*	2.22	1.85	1.82	0.00
14	*Cercospora sp*	1.84	0.00	0.00	2.22
15	*Chetomium aureum*	0.00	1.10	0.00	0.36
16	*Chaetomium bostrychodes*	0.00	0.00	7.24	0.00
17	*Chaetomium globosum*	0.00	0.56	2.22	2.22
18	*Cladosporium cladosporioides*	0.00	0.36	6.84	2.22
19	*Cladosporium herbarum*	0.00	0.00	0.00	1.10
20	*Cunninghamella echinulata*	0.54	0.00	0.00	0.00
21	*Curvularia andropogonis*	0.36	0.00	7.24	2.22
22	*Curvularia lunata*	6.84	6.84	7.24	7.15
23	*Curvularia pallescens*	0.00	1.10	2.22	6.84
24	*Dendrophoma sp*	2.22	0.00	1.10	1.10
25	*Drachslera australiensis*	6.49	0.00	0.00	6.49
26	*Drachslera hawaiensis*	0.00	1.85	0.00	0.00
27	*Drachslera rostata*	0.00	0.61	0.00	0.00
28	*Fusarium avenaceum*	2.22	0.61	0.00	2.22
29	*Fusarium bostrycoides*	0.00	0.00	12.48	0.00
30	*Fusarium dimarum*	0.00	7.24	9.46	7.15
31	*Fusatium equiseti*	6.49	2.35	0.00	0.00
32	*Fusarium monoliforme*	6.49	0.00	12.48	1.10
33	*Fusarium oxysporum*	6.49	0.00	2.22	1.10
34	*Fusaruim solani*	2.22	7.24	7.24	2.22
35	*Gliocladium sp*	1.84	0.00	0.00	0.00

36	*Humicola sp*	1.84	0.00	0.00	0.00
37	*Memnoniella echinata*	1.18	6.84	0.00	0.00
38	*Mucor varians*	1.84	2.41	0.00	9.46
39	*Myrothecium gramineum*	1.18	0.00	0.00	0.00
40	*Neocosmospora sp*	0.00	3.21	0.00	0.00
41	*Nigrospora sphaerica*	1.18	7.15	0.00	0.00
42	*Paecilomyces sp*	0.00	0.00	0.00	1.85
43	*Penicillium citirnum*	2.35	9.46	2.22	6.49
44	*Penicillium variable*	2.35	0.36	1.10	7.15
45	*Phoma fekelli*	1.08	1.10	0.00	2.22
46	*Phoma humicola*	0.00	0.00	0.00	1.84
47	*Phoma nebulosa*	0.00	0.00	0.00	1.84
48	*Phycomyces sp*	2.35	0.00	0.00	1.10
49	*Rhizopus nodosus*	4.44	0.00	0.00	1.10
50	*Rhizopus sp*	1.08	3.21	0.00	1.10
51	*Sclerotuim sp*	0.00	0.36	0.00	0.00
52	*Sphaeronaema sp*	0.00	1.10	0.00	0.00
53	*Spicaria fusispora*	0.00	2.22	0.00	0.00
54	*Torula herbarum*	0.00	1.10	0.00	0.00
55	*Yeast*	0.00	2.22	0.00	7.15
	Total	100.00	100.00	100.00	100.00

NRS-Non-rhizosphere, RS-Rhizosphere, RP- Rhizoplane and PP- Phylloplane.

Table-2 shows Physical factors and microbial numbers of Non-rhizosphere and Rhizosphere of Oldenlandia corymbosa.

S.NO	SAMPLING DAYS	SOIL PH		% SOIL MOSTURE/10g		TEMPERATURE		FUNGI (X10^3)	FUNGI (X10^3)
		NRS	RS	NRS	RS	MAX	MIN	NRS	RS
1	20^{th}DAY	8.18	8.22	0.84	1.10	28.93	19.05	11.0	14.0
2	40^{th}DAY	8.18	8.22	1.13	1.42	29.43	12.25	7.50	1150
3	60^{th}DAY	8.00	8.18	1.59	1.70	28.97	13.98	7.50	9.00
4	80^{th}DAY	8.00	8.18	1.04	1.50	31.26	18.30	12.50	8.50
5	100^{th}DAY	7.90	8.18	1.08	1.38	34.68	18.86	6.50	11.00
	TOTAL	**8.06**	**8.19**	**1.14**	**1.43**	**30.65**	**16.49**	**9.00**	**10.80**

Table-3 shows soil minerals in relationship with fungal numbers in *oldenlandiacorymbosa*

Table-4 shows Physical factors and microbial numbers of Phylloplane of Oldenlandia corymbosa

S.NO	SAMPLING DAY	RAINFALL	RELATIVE HUMIDITY	TEMPERATURE		FUNGI (X10^3)
				MAX	MIN	
1	20thDAY	4.36	70.33	28.93	19.05	6.33
2	40thDAY	1.49	63.40	29.43	12.25	7.20
3	60thDAY	0.29	51.80	28.97	13.98	7.50
4	80thDAY	0.00	38.66	31.26	18.30	6.66
5	100thDAY	1.60	35.22	34.68	18.86	6.50
	TOTAL	1.55	51.77	30.65	16.49	6.84

Table-2 shows effect of physical factors on fungal population.Establishment and survival and growth of microorganisms in soil depends on complex interaction of edaphic factors, climatic factor and biotic factors

		NON RHIZOSPHERE SOILS					RHIZOSPHERE SOILS				
S.NO	SAMPLING DAY	ORGANIC CARBON	PHOSPHORUS	POTASSIUM	TOTAL NITROGEN	FUNGI (X10^3	ORGANIC CARBON	PHOSPHORUS	POTASSIUM	TOTAL NITROGEN	FUNGI (X10^3
1	20thDAY	0.94	67.7	481.6	1.62	11.0	1.00	56.8	431.00	1.62	14.0
2	40thDAY	1.14	61.9	425.9	1.75	7.50	1.18	65.8	436.00	1.72	1150
3	60thDAY	1.07	80.8	470.1	1.75	7.50	1.18	75.5	465.0	1.80	9.00
4	80thDAY	1.18	97.4	522.2	1.82	12.50	1.25	119.3	552.6	1.76	8.50
5	100thDAY	0.97	77.44	400.5	1.75	6.50	1.25	70.00	455.6	1.75	11.00
	Total	1.06	77.048	460.06	1.738	9.00	1.06	77.48	468.04	1.73	10.80

(Subba rao,1977). The hydrogen ion concentration (pH) not only influences soil drainage, nutritional uptake of the plant but also its impact on growth of microorganisms. The pH of the soil was alkaline the pH of rhizosphere was slightly higher compared to non rhizosphere soils (Chowdhury et al 1993).Moisture content in the soil was in both non-rhizosphere and rhizosphere soils increased along the sampling season which had positive impact on fugal numbers.(Jone et al, 1994).The average maximum and minimum temperatures were higher during the later part of the seasons. Lower minimum and maximum temperatures appears to have favoured development of mycoflora in both non-rhizosphere and rhizosphere soils.(Zhang et al, 1992)Table-3 shows soil minerals in relationship with fungal numbers in *oldenlandia corymbosa*.The available organic carbon in non rhizosphere increased during sampling period, this had positive effect on mycoflora. Similar effect was also seen in rhizosphere soils, however organic carbon was higher in rhizosphere soils than non-rhizosphere soils.(Srivastava and Sinha ,1991). Phosphorus levels in both the soils were increasing which favoured the growth of fungal numbers. Higher potassium in the soils reflected higher mycoflora.(Mahamood and Ramarao ,1992) Total available nitrogen increased during the sampling season both in nonrhizosphere and rhizosphere soils this had positive effect on fungal species (Burke at al,1992).

The leaf surface acts as a landing space for aerial spores and the topography appears to have great effect on microorganisms Kerling (1964). Once these propagules are on the leaf surface of they derive the benefit from the exudation of nutrients and multiply. The establishment and the growth of mycoflora is governed by environmental factors and biochemical nature of the leaves The study of relative changes in quantity and quality of microorganisms would help in developing effective control of various crops (Linda ,1997).Studies on phyllosphere mycoflora of three sugarcane varieties yielded 80 fungal species,(Bachchhav and Bhinde, 1993). Sinha and Asha (1992) found that fungal population increased during rainy season and decreased at very high and low temperatures. The humidity on the leaf surface depends on the rate of transpiration and relative humidity. Lower relative humidity favours the dispersal of spores (Pady,1971) high relative humidity help in luxuriant growth of saprophytic and epiphytic mycoflora (Lee,1990).In the present studies phylloplane harbored a total of 29 fungal species, some of them were *Paecilomyces sp, Phoma nebulosa* and *Phoma humicola*..The leaf ecosystem can be regarded as continuous culture in which organism varies independently in response to changes in microclimate of leaf surface and available nutrition. Population and its specific composition is affected by weather conditions, some are present throughout the year some are specific to particular climate. Table 4 shows higher rainfall and higher relative humidity favoured the growth of mycoorganisms; optimum temperatures had positive impact on multiplication of fungal numbers. Some of the common species found on the plant body were *Aspergillus niger, Aureobasidium pullans, Curvularia lunata, Fusarium solani, Penicillium citrunum,Penicillium variable etc*.

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